



## **Energy Efficient Lighting for Florida Homes<sup>1</sup>**

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Although lighting doesn't constitute a major portion of the average homeowner's electric bill (generally from 3 to 15 percent), you can cut your lighting costs significantly by installing new energy-efficient bulbs.

As an added plus for Florida residents, these new bulbs produce less heat, meaning less work for your air conditioner.

### **ALL LIGHT BULBS ARE NOT CREATED EQUAL**

Edison's familiar incandescent light bulb may be inexpensive and convenient, but it doesn't perform its job very well. Over 90 percent of the electricity that it uses is converted into heat rather than light. If yours is the typical Florida household with 27 light sockets, then you actually have 27 little space heaters making you feel warmer and making your air conditioner work harder.

Put another way, 600 watts of lights burning in a cooled Florida home on a summer evening requires about 300 watts of additional electricity from the air conditioner to remove the waste heat from the house.

The new choices of light bulbs are much more efficient and often last much longer than the ordinary incandescent bulb: compact fluorescent (CF), tungsten-

halogen, and krypton-filled. Table 1 summarizes data collected by the Florida Solar Energy Center on the characteristics of the various lighting alternatives. Cost data was obtained from local distributors.

### **COMPACT FLUORESCENT BULBS**

Compact fluorescent bulbs, or CFs, are miniaturized versions of full-sized fluorescent tubes, available with a screw-in base that fits in a conventional fixture. They vary from 5 to 18 watts and produce about four times more light per watt than conventional bulbs.

These bulbs, like other modern fluorescent tubes, don't flicker, buzz or hum, and they start rapidly. Now they also provide a pleasing, warm-yellow light similar to incandescent bulbs, at a much lower wattage. An 18-watt CF bulb, for instance, produces the light of a 75-watt incandescent.

While CFs cost more to purchase than conventional bulbs (from \$12 to \$25 each), they're less expensive to operate since they save energy and last so much longer (from 7,500 to 10,000 hours) than incandescent bulbs (750 hours). They pay for themselves quickly if used four or more hours a day.

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**Table 1.** Comparison of residential lighting alternatives.

Lamp	Wattage <sup>1</sup>	Lifetime (hours)	CR <sup>2</sup>	Cost for 12,000 hours of lighting
Standard incandescent	60	750-1,000	93	\$0.40-\$0.80
Long-life standard incandescent	65	1,500-3,500	93	\$0.50-\$1.60
Krypton-filled incandescent "miser"	56	800-1,100	93	\$0.85-\$1.00
Tungsten-halogen incandescent	42	2,000-3,500	93	\$2.50-\$4.00
Compact fluorescent	15	7,500-10,000	82	\$12.00-\$25.00
Circular fluorescent screw-in	22	12,000	60	\$9.00
Fluorescent tube "cool white"	12	18,000	60	\$8.00
Fluorescent tube "warm white"	13	18,000	70	\$9.50
Fluorescent tube "deluxe warm white"	13	18,000	80	\$10.00
1. Equivalent wattage to produce the light of a conventional 60 watt incandescent.				
2. CR = Color Rendering Index.				

### TUNGSTEN-HALOGEN INCANDESCENT BULBS

A new energy-efficient variation on our familiar Edison bulb is the tungsten-halogen bulb. It uses 20-percent less electricity to produce the same amount of light and lasts about four times longer. Tungstenhalogen bulbs are most appropriate in track, accent or flood lighting since they provide a very controlled light beam, although they may flicker when used with a dimmer.

Although halogen bulbs are a bit more expensive than conventional ones (\$2 - \$4 each) and last much longer, they are less efficient than the compact fluorescent bulbs, and have to be replaced more frequently.

### KRYPTON-FILLED INCANDESCENT BULBS

A more efficient krypton-filled incandescent bulb known as the "energy miser" is readily available at local stores. It uses slightly less electricity to produce the same amount of light as a conventional bulb, costs about \$0.25 more per bulb, and has a slightly greater life expectancy.

### WILL MY UTILITY BILL BE LOWER?

Using energy-efficient bulbs saves you money by reducing bulb replacement costs and lowering electricity use. Replacing four 75-watt bulbs that are used four hours each day with CFs will save about 330 kWh per year for lighting — a savings of about \$27 at current electric rates. Not only will you use less electricity to produce the same amount of light, but your more efficient bulbs will give off less heat, so the air conditioner runs less — a decided advantage in Florida.

Florida Solar Energy Center studies show that each watt saved in a bulb that is used four hours per day yields an annual savings of about 0.23 kilowatt hours (kWh) per year in reduced air conditioning costs. Replacing a single incandescent bulb with a CF, for example, saves 57 watts, which in turn adds up to a savings of 13.1 kWh in air conditioning per year for each bulb replaced.

### OUTDOOR LIGHTING

Many of the considerations in energy-efficient lighting apply to outdoor lighting at night as well. Halogen incandescent bulbs are good choices when lighting is used for more than an hour, fluorescent lights are especially efficient in spots where they may accidentally be left on for longer periods of time. A point to keep in mind — some compact fluorescent bulbs may not start well when temperatures fall below 30 degrees, limiting their winter outdoor operation in Northern Florida.

On another note, consider solar lighting. Photovoltaic (solar cell) powered outdoor fluorescent lights are now a low-cost alternative for some applications.

## MATCH LIGHTING TO ITS USE

When planning the lighting for each room, think about the activities that will take place there. Remember, too, that older people need more light. Did you know that you can make a room appear larger by filling it with light? Illuminate the ceilings and walls: a continuous valence around the room can house fluorescent strips while wall sconces can contain individual compact fluorescent bulbs. Floor lamps with CFs help distribute light upward. Small incandescent lights on dimmers, or tungsten-halogen lamps, accentuate special features such as artwork or a fireplace.

## BROADER IMPLICATIONS OF ENERGY-EFFICIENT LIGHTING

Energy-efficient lighting provides more benefits than dollar savings alone. Each additional 100-watt incandescent bulb placed in your home requires at least \$150 to build new electrical generation resources to meet the demand. These costs eventually get passed on to consumers in the form of higher electric rates. Multiplied by thousands of households, increased energy demands mean supplemental transmission lines, more dependence on foreign energy supplies and worsening air pollution.

A 15-watt compact fluorescent keeps half a ton of carbon dioxide and twenty pounds of sulfur dioxide and nitrogen oxides out of the air, pollutants that cause the greenhouse effect, acid rain and air pollution. As a further incentive, every CF you use will keep ten burned-out incandescent bulbs out of your local landfill.

## WHERE DO YOU GET THESE ENERGY EFFICIENT BULBS?

The krypton-filled "energy miser" bulbs are widely available at local stores. Hardware stores have fluorescent tube fixtures, but compact

## Efficient Lighting Tips

- Use low-wattage incandescent bulbs in areas where lighting levels aren't critical: closets, hallways and porches. Night lights don't need to be more than four watts.
- Adjust lighting levels to reduce energy use, and extend the life of incandescent bulbs with dimmers. Inexpensive dimmers that screw into conventional sockets are now available. Do not, however, use a dimmer with compact fluorescent bulbs, as it will shorten their useful life.
- Turn off lights not being used. The old adage about not turning off fluorescent lights if you're out of the room less than ten minutes is no longer true with modern ballasts. Frequent starts reduce tube life slightly, but the energy saved outweighs the shortened life span.
- Instead of long-life incandescent bulbs, which use more electricity to produce less light, choose low-wattage halogen bulbs, especially for inaccessible locations. They last even longer and save energy as well.
- Choose CFs for fixtures that are used four hours or more each day.
- Use automatic controls. Photocells or timers turn lights on and off to give a home the appearance of being occupied. They automatically turn lights on so you don't have to arrive home to a darkened house. Motion sensors activate lights when you enter a room and turn them off five minutes after motion is no longer detected.
- Take full advantage of daylight. Open drapes or blinds on north and south windows during the day. Consider sky lights for interior rooms that don't receive enough natural light. Minimize glare from east and west windows with exterior plants, awnings and overhangs.
- Paint a room a light color to reflect light, and don't forget to clean your light fixtures often - dust cuts down illumination considerably.

fluorescents and halogens can be more difficult to find.

Call these toll-free numbers to find a local supplier:

**General Electric:** 1-800-626-2000

**GTE-Sylvania:** 1-800-225-5483

**Philips:** 1-800-752-2852

Mail order houses have many of these bulbs available, sometimes at lower prices than local suppliers. Call for these catalogs:

**Real Goods:** 1-800-762-7325

**Seventh Generation:** 1-800-456-1177

### CONCLUSION

You don't have to minimize lighting levels just to save energy. With all the choices of efficient fixtures and bulbs available, you can provide sufficient illumination and cut your utility bills, saving both energy and money.

## Comparing the Cost of Lighting

Use this simple worksheet to compare the cost of light per thousand hours for any lamp you are considering. Remember that meaningful comparisons are only possible for bulbs that have a similar lumens output. Current electrical rates in Florida are about \$0.08/kWh.

	Base	Alternative
A. What is the cost per kWh?	_____ \$/kWh	_____
B. How many watts are used by the fixture?	_____ Watts	_____
C. What is the rated lifetime of the lamp?	_____ Hours	_____
D. How much does the bulb cost?	_____ \$	_____
E. Estimate the electricity costs. Multiply A by B.	_____ \$	_____
F. Estimate the replacement costs. Divide D by C and multiply by 1,000.	_____ \$	_____
G. Estimate the air conditioning penalty. Multiply B by 0.15 by A.	_____ \$	_____
H. Estimate the total operating cost. Add E, F and G.	_____ \$	_____